ANALYSIS OF PARTICULATE PHASE OF CIGARETTE SMOKE AND TOBACCO HEATING PRODUCT AEROSOL USING A TD-GC×GC-LRTOFMS/FID APPROACH

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During the last few years, tobacco heating (heat-not-burn) products (THPs) have been developed. However, the chemical composition of aerosols produced by selected THP differs significantly from the chemical composition of the smoke generated by tobacco cigarettes and is not yet fully characterized. To date, most of the published chemical characterisations of THP aerosols have focused on toxicants proposed by regulators based on cigarette smoke. The detailed chemical composition of THP aerosols remains relatively unclear because dedicated analytical methods are not established for this purpose. In this context, we have developed an analytical method based on thermal desorption and comprehensive two-dimensional gas chromatography coupled to time-of-flight mass spectrometry and flame ionisation detection (TD-GC×GC-TOFMS/FID). The splitting of the flow between the detectors was achieved using a controlled flow splitter (CFT) with different lengths and diameters of capillary columns to reach a 1:1 split ratio between FID and TOFMS. Particulate phase aerosol samples were collected on thermal desorption tubes filled with quartz wool and later recollected onto a set of ten tubes filled with tenax/sulficarb sorbents. This new sample dilution and extraction procedure facilitates the comparison of particulate phase samples from cigarette smoke and a commercial THP aerosols. TOFMS and FID data were used to generate qualitative and semi-quantitative information, respectively. The results confirm the capability of the developed method to provide a chemical profile for the aerosol generated from THPs and to demonstrate the relative simplicity of THP aerosol in comparison to mainstream cigarette smoke.